

- n. Low battery voltage
- o. Battery charger failure
- cc. High generator stator temperature

NOTE: Shutdowns and alarms ("a" through "s") are identified to correspond with required function listed in NFPA 110. The other shutdowns and alarms ("aa" through "dd") are identified as such for convenience. Shutdowns and alarms which are identified by the same letter designation in both lists shall activate at the same setpoint.

The EMCP shall be equipped with standard controls, engine and generator monitoring using an LCD display, alarm and shutdown indications, and provisions for RS485 Modbus connection to the PLC. No additional engine-mounted instruments or meters are required. The EMCP shall be provided with a CD disk containing a back-up copy of the installed EMCP control software. The EMCP shall be Caterpillar EMCP 3.3 or approved equal.

2.17.2 Digital Synchronizing and Load Control Unit

A digital synchronizing and load control unit (DSLCL) shall be provided for automatic synchronizing of the DG unit across its generator breaker. The DSLCL shall be connected to CTs at the generator, and to line and bus voltage transformers in the switchgear. The DSLCL shall provide for parallel operation, isochronous load sharing, and load control of multiple DG units as indicated. The DSLCL shall be interconnected with other DSLCLs using a dedicated Ethernet network, to be used solely for load sharing and load control. DSLCL units shall be Woodward Model DSLCL-2 or approved equal.

2.17.3 Master Synchronizing and Load Control Unit

A master synchronizing and load control unit (MSLC) shall be provided for coordination of the individual DSLCL units. A private Ethernet shall be provided and configured to connect the MSLC unit to the DSLCL units. The MSLC shall communicate with connected DSLCL units over the private Ethernet.

The MSLC shall interface between the power plant and Xcel Energy. Closing of the utility tie shall be supervised by the MSLC unit. Breaker closing shall be allowed when the utility and local system are properly synchronized and when the utility is energized and the local system is not. Breaker closing shall not be allowed when the utility is not energized.

Synchronization between utility and local system shall be accomplished by changing local generation to match utility generation in frequency, phase angle, and voltage.

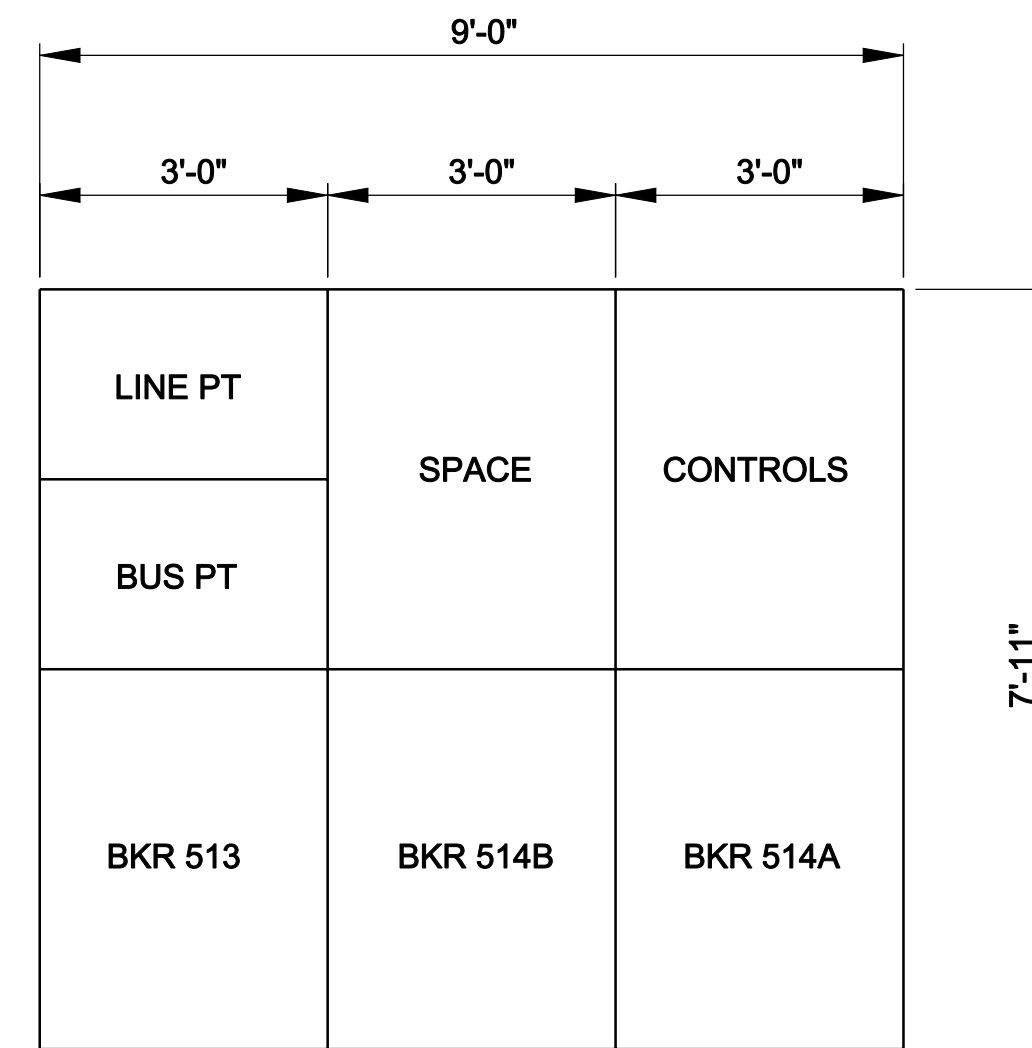
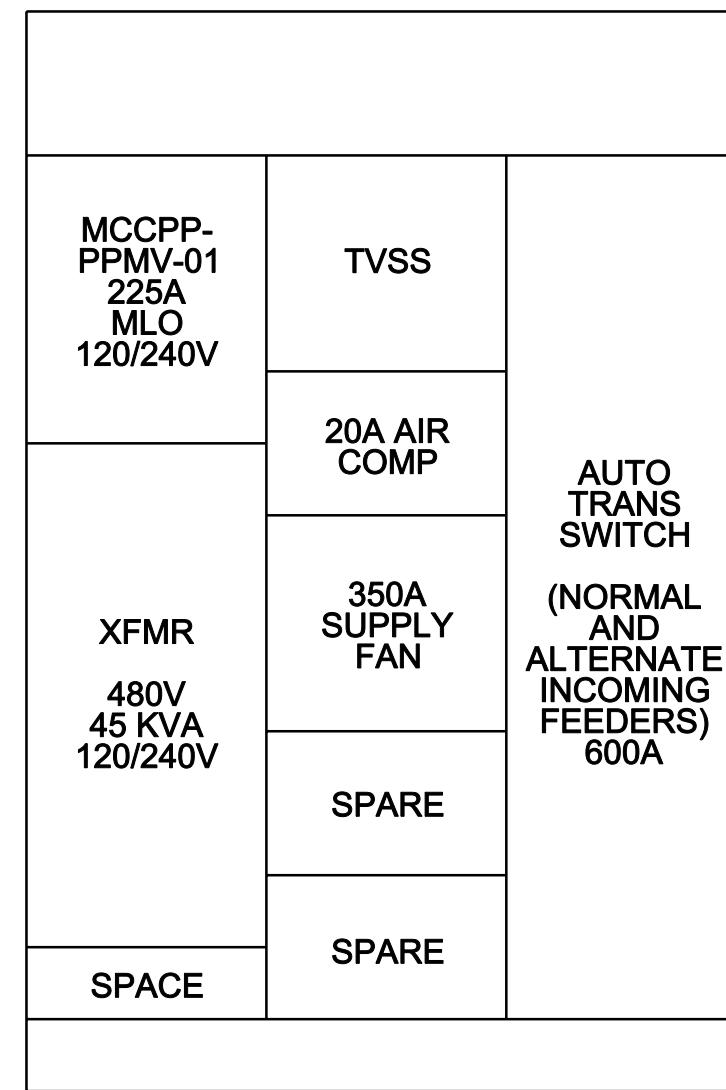
MSLC units shall be Woodward Model MSLC-2 or approved equal.

2.17.4 PLC

The EMCP and DSLCL shall interface with the SCADA System as indicated on the drawings and as specified in Section 25 10 11 SUPERVISORY CONTROL AND DATA ACQUISITION (SCADA). Each DGCP shall have a PLC with data ports and discrete inputs and outputs to connect to the EMCP, DSLCL, and RTD module. The PLC shall provide remote commands from the SCADA workstations as indicated.

For generators operating at medium voltage, the PLC will be provided in the ~~motor control center~~ associated with each DG unit. The DGCP shall have a

generator switchgear



MVS-PPMV-11

SCALE: NTS
(SEE NOTE 1)

GEN SWGR MVS-PPMV-"XX"	GENERATOR DG-PPMV-"AA"	GEN BKR 5"BB"	LB BKR 5"CC"
MVS-PPMV-01	DG-PPMV-01	515	516
MVS-PPMV-02	DG-PPMV-02	517	518
MVS-PPMV-03	DG-PPMV-03	519	520
MVS-PPMV-04	DG-PPMV-04	521	522
MVS-PPMV-05	DG-PPMV-05	523	524

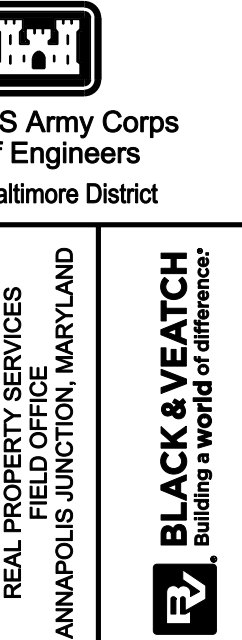
ISSUED FOR CONSTRUCTION

ACTIVITY MANAGER:
DATE: 10-25-2011

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**POWER PLANT
ELEVATIONS
MCC, GENERATOR, AND UTILITY
SWITCHGEAR**

Drawing No.
60018

Sheet Reference No.
E2-201

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